



TAPE IT

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Contents

- **LTO-5 Ultrium with LTFS - the award winning combination for the M&E industry**
- **Gartner research highlights evolution of tape for active archive**
- **Shipped tape capacity continues to outpace disk**
- **ESG Webinar on TCO of disk v tape for archive applications**



LTO-5 Ultrium with LTFS: The award winning combination for the media and entertainment industry

The International Broadcast Conference ([IBC2011](#)) in Amsterdam this September attracted over 50,000 visitors, giving a clear indication of the size and resilience of the broadcasting media and entertainment industry, despite the current economic climate.

In a landscape dominated by increasingly high quality video capture, massive data volumes and long term asset utilization and retention, tape is increasing in popularity. In their [2011 report](#) 'Digital Storage for Media and Entertainment',

Analysts Coughlin Associates, estimate that between 2011 and 2016 the media and entertainment industry will experience a 7.7x increase in the required digital storage capacity, and a 5.6x growth in storage capacity shipments per year. Digital archiving, content conversion, and preservation alone will require around 61 Exabytes of capacity by 2016.



“Our surveys show the highest percentage of true archived content is kept on digital magnetic tape. The most popular digital magnetic tape format for archiving (based upon our survey) is LTO tape (with 66% share).”

Coughlin Associates, Report on Digital Storage for Media and Entertainment, June 2011

Why tape in broadcast media and entertainment?

“For media producers, all this digital content brings with it at least two problems: storing it today for production purposes and then storing it forever — just because you may someday need it.”

Brad Dick, Broadcast Engineering

In a series of articles Brad Dick, Editorial Director of Broadcast Engineering, endorses the use of tape to “reduce storage costs, protect your business and ensure a long life for your content”.

The majority of digital video assets retain some level of value because they have often been captured at a point in time that cannot be recreated. These assets must be protected for many years both for cultural value and for reuse, as Brad Dick suggests “the long-tail of media offers the opportunity for long-lived revenue”. Digital assets need therefore to be stored for both long-term protection, and in a manner that enables their reuse when the opportunity arises.

However, with mounting volumes of high resolution digital video to store, this can lead to solutions that are both expensive and inefficient which has led Brad Dick to recommend the use of tape. His argument for tape-based active archiving is based on the following evidence:

- 90 percent of data stored is never accessed again, according to a study by the University of California, Santa Cruz. As Brad Dick explains;

“What is it costing you to store 90 percent of your media that may never again be used? The only acceptable answer is free. If it costs anything to store that 90 percent of your data, the costs may be too high.”

- There have been numerous TCO studies performed, including those by the Enterprise Systems Group (ESG) and The Clipper Group which show that over time, tape is 15x less expensive than disk storage when storing data over a 12-year period.
- Power consumption should be a part of TCO storage calculations. The Clipper Group TCO report shows that the disk solution used 238 times more energy than the tape-based solution. And in fact the cost of simply powering the spinning disks over 12 years was more than the total purchase cost of the tape system.



Against this backdrop, LTO Ultrium tape is making its mark, and LTO-5 with LTFS functionality is proving to be a key workflow component for professionals engaged in the creation, management and delivery of broadcasting media and entertainment.

A variety of new applications for LTO Ultrium tape have been developed to deliver ways to retain digital assets, both finished and raw, and permit online disk-like operation but without the cost normally associated with vast arrays of spinning disks.

The growing list of development partners for HP LTO-5 with LTFS in the Media and Entertainment industry includes:

Arkivum – Transparent Data Archiving Services

Atempo – Data Management Solutions

1Beyond Inc – Digital Video Systems

Cache-A Corporation – Archive Appliances

StorageDNA – Complete Media Management

For-A Global – Video and Audio Technologies

Panasonic – Video Ingest Software

SGL Ltd. – Broadcast Archive and Storage Content Management Solutions

Thought Equity Motion Corporation – Online Stock Footage Library

LTO-5 archive appliance is the professional user's choice

- The [Creative COW](#) worldwide network for digital and broadcast professionals presented Cache-A's Pro-Cache5 with the Blue Ribbon User's Choice Award for Best Archiving System following months of monitoring feedback from over 1.7 million monthly visits. Leveraging the technical innovations of HP LTO-5 (including LTFS), Pro-Cache5 further extends tape's key role in ensuring long-term content retention, archiving and disaster recovery.
- According to [Broadcast News](#), leading Los Angeles (LA) post houses are increasingly choosing LTO-5 Ultrium based archive appliances, such as those from Cache-A, to preserve and protect the massive amounts of

data they generate daily. Digital media professionals are using these appliances to create source masters in acquisition workflows. At the same time, they get the benefit of long-term archival storage that delivers fast, easy access to their content assets at every stage of production and post production.

- Some of the LA post houses now employing this approach include All Media Post (for Castle Rock, DreamWorks, Miramax, 20th Century Fox, Warner Bros.), Lussier (for ABC, Fox, NBC, Sony, TBS), Nomad Editing (for Apple, Gillette, Pepsi, TD Bank, Visa), and The Post Group (for The Amazing Race, CSI: Crime Scene Investigation, House M.D., Miami Medical, Numb3rs).



127 Hours – LTO plays it's part in digital workflows in the desert

The making of the movie '127 Hours' resulted in both a blockbuster, and a breakthrough in remote location digital production workflows.

The movie director, Danny Boyle, decided that shooting the footage of the harrowing true story of mountain climber Aron Ralston on location in Utah was essential to the authenticity of the movie. However, this gave rise to the challenge of managing workflows from the desert.

A key aspect of the work involved capturing assets at the rate of 300GB per hour, and then archiving and protecting these assets. The company chosen to undertake the work created

a “redundancy tree” that ensured multiple copies of every piece of footage; the “camera negative,” in the form of a solid-state drive, stayed on set, but two copies were backed up onto LTO tape using a Cache-A archive appliance with HP LTO tape drives. One LTO tape stayed at the Utah facility, while the other was shipped to Fox studios.

In taking this approach, the studio was able to protect assets by distributing them on multiple media and in multiple locations at any one time. Their reliance on LTO Ultrium is an endorsement for the reliability and dependability of the technology.



Reducing the dependency on specific media

In addition to the tragic consequences to life, the natural disaster in Japan in March 2011 also had commercial and economic implications. One such implication has been the greatly constrained availability of HDCAM-SR tape media which had been widely used across the media and entertainment industry. This left producers and post production facilities, ranging from independents to large post houses and film studios, looking for creative ways to maximize their existing stocks.

Step forward LTO-5 drives with TOLIS Group's BRU backup and archive software. This combination has now been successfully implemented by DigitalFilm Tree, a Post Production consulting, creative and software development company in Hollywood. DigitalFilm

Tree has a heterogeneous environment applying numerous applications which are frequently in use around the clock; they need to deliver content on a medium that is digital, readable by any system, and will not degrade the quality of the content. Using LTO-5 Ultrium technology with TOLIS Group's BRU software, the company was able to copy and backup raw and finished content, reserving remaining stocks of HDCAM-SR tapes for other specific applications.

HP LTO 5 technology combined with TOLIS group software offers a way to augment digital production workflows easily and seamlessly, one which liberates the media and entertainment industry from being dependent on a single source for a critical component.

“This TV season, LT05/LTFS is part of the entire acquisition to final post finishing workflow for shows like Cougar Town and NCIS: LA. These technologies have performed incredibly well with our file-based solutions.”
Ramy Katrib from DigitalFilm Tree

Delivering an archival solution for Japanese television

In Japan as in other parts of the world, the Fuji Television Network Corporation was seeking ways to manage the archival of high volumes of video footage and computer graphics production. The network was particularly focused on ensuring that non-IT staff – including

camera and production engineers – would be able to easily archive their own work.

HP LTO-5 Ultrium with LTF5 proved to be the ideal solution, delivering ease of use and simple file handling. It also provides the network with high capacity storage with a low cost per Gigabyte.

Improving post production workflow, archive and costs

FotoKem is a large film lab and post production company with facilities based in Burbank, Hollywood, Santa Monica, and San Francisco California. The company handles all kinds of post production work, including digital intermediates (DI), home video mastering and restoration, TV finishing, audio, dubbing, file encoding and much more.

Faced with mounting data volumes, the company was struggling with the time and complexity involved in the traditional ‘tar’ method of archiving single DPX frames. As a result FotoKem implemented an LTO-5 Ultrium solution for general purpose backup, asset storage and management of mezzanine files, and as a mounted file system as part of the ‘finish’ during the conform process. In addition to this internal use, FotoKem were able to implement the solution to support external clients.

FotoKem client case study

A Reality TV Customer needed to recycle HDCAM-SR and XDCAM disks as new ones were not available. Using LTO-5 Ultrium with LTF5, FotoKem was able to create systems to back up the data, create the database, perform checksum data, and then back up to LTO-5 with LTF5 as follows:

- Read the files from XDCAM disks using a Mac system
- Copy the files onto a Linux server
- Make a database of file information
- Check for data integrity with the standard MD5 checksum algorithm, and track writing onto tape – there were no issues found with checksums
- Create two copies of the LTO-5 tape, one for local use, and one for offsite disaster recovery purposes

- Used LTO-5 with extended attributes such as tape ‘tape fullness’ and the universal unique identifier code (UUID)

This approach resulted in a number of benefits, including:

Save money and storage space – with the ability to store 100 XDCAM disks on one LTO-5 tape. This solution also enables reuse of the more expensive XDCAM disks.

Enhance reliability and data protection – no checksum issues, improves essence protection, inexpensive to prepare two copies of the LTO Ultrium tapes (keep one copy offsite).

Easy to use, script and support – with open tools, and much easier to use than scripted TAR solutions.



In conclusion

The media and entertainment industry is increasingly aware that LTO-5 Ultrium with LTFS can deliver a solution to the expense and complexity involved in today's digital media asset retention. Vendors within the industry are developing and launching a range of hardware and software applications that make the most of the LTO-5 technology to deliver reliable, inexpensive, and easy to use archiving solutions. With rapid take-up by production houses large and small, we can expect to see many more innovative applications over the coming months. Watch this space!



Gartner research highlights the evolution of tape as an active archive technology

In their July 2011 research report “Tape’s Role Is Changing from Data Protection to Active Archiving”, Dave Russell and Sheila Childs of Gartner suggest that, while tape is still used by 78% of their respondents for data protection, it is playing an increasingly solid role for archiving and long-term record retention. Gartner believes that this is primarily due to a low total cost of ownership (TCO) combined with tape’s small size and portability.

For backup use cases

- Organizations are increasingly backing up and recovering from disk to meet backup windows and faster file restore requirements.
- However, in verticals that generate multiple petabytes of data, tape is able to deliver an ‘active archive’ or low-cost tier of storage. For example, in genomic research, seismic data and other high performance computing (HPC) applications, or in media and entertainment applications, the volume of data and infrequent access patterns require high density, scalability and reliability that can only be provided by the modern tape technologies.
- Tape also provides an attractive tertiary copy of data, where data stored on offline tape consumes no power, requires no extra cooling and becomes the “instance policy to the insurance policy of disk-based backup”.
- Tape is a perfect fall-back position for disk-drive failure. Although disk is typically configured with additional protection schemes, such as redundant array of independent disks (RAID) and erasure codes, one tape drive is likely to have a longer operational life span than one disk spindle. As disk drive capacities increase, the outages associated with RAID rebuild times for a double disk failure are likely to extend from weeks to months. Tape then delivers an ideal interim solution while disk repair takes place.
- Disk-based backup solutions now enable more cost-effective ways of delivering replication. As a consequence, more organizations are able to send their backup data to a secondary site, and locate their tape drives and libraries there also. As a result, backup data at the secondary site can be copied directly to tape for off-line storage, eliminating the need to manually move tape volumes off-site on a daily basis.



For archive use cases

- Tape remains viable and attractive for long-term record retention and historical data preservation in all vertical industries, in part because of its ability to continue to store data without power, and also retain it for periods of multiple years.
- Media life for tape volumes is rated at between 15 and 30 years, which is two to five times longer than the typical life span for disk systems. Although most organizations are likely to refresh their tape media sooner than the rated maximum life of the volume, the ability to store long-term data on a target, without having to move it for significant periods of time, is a compelling tape feature.
- As tape libraries grow in capacity, more and more data can be stored, leading to larger repositories that provide access to data for longer period of times.
- LTFS makes tapes even more portable, and archived data stored long term can be easily accessed without backup software which further positions tape as a viable repository for the long-term preservation of data.
- Furthermore, tape provides other functionality that is appropriate for archived data, including support for encryption with little overhead, and longer time between system refreshes versus disk. Both capabilities lend themselves well to the long-term historical preservation of potentially sensitive data.

In conclusion, the Gartner report states that;

“With recent advancements in tape capacity and faster direct access, tape looks to remain a solid choice for organizations that need to retrieve data for historical audits, compliance, or other manipulation of historical content.”

Shipped tape capacity continues to outpace disk

IDC have released the Q2 CY11 update to their WW Disk Storage Tracker and the results show that total tape storage media capacity shipped continues to surpass (by around 14%) total shipped external disk systems storage capacity. Total tape storage media capacity shipped reached 4,235 Petabytes in Q2 CY'11, according to [The Santa Clara Consulting Group \(SCCG\)](#). This compares to 3,702 Petabytes of total external disk systems storage capacity shipped in Q2 CY'11, according to IDC.

According to the SCCG, over 5.7million LTO tape cartridges were shipped in calendar Q2 2011 with LTO-5 the bright spot rising 22% quarter on quarter from calendar Q1 2011 to account for 16% of total market unit sales and 33% of total

market dollars in the quarter. LTO-4 remains the highest selling generation of media, accounting for 45% of total market unit sales and 36% of total market dollars in calendar Q2'11. HP continues to lead the LTO Ultrium market with 32% media volume share within the quarter. The SCCG report concludes that in Q3 CY'11 LTO media volume is expected increase over Q2'11, supported by higher volumes of LTO-5 and LTO-4.

These results provide another positive proof point for the ongoing robustness of tape market demand, and may go some way to substantiate the growing use of tape in archiving applications.

WEBINAR: Find out why tape continues to offer significant cost savings over disk

Join Mark Peters of the Enterprise Strategy Group (ESG) to examine the findings of the ESG TCO study which found that an LTO-5 tape system had significant total cost of ownership (TCO) benefits over a disk system with data deduplication (including lower cost per GB, lower operating expenses and lower energy costs).

Click here to register or listen to a recording of the webinar: [<go-to-meeting>](#)

